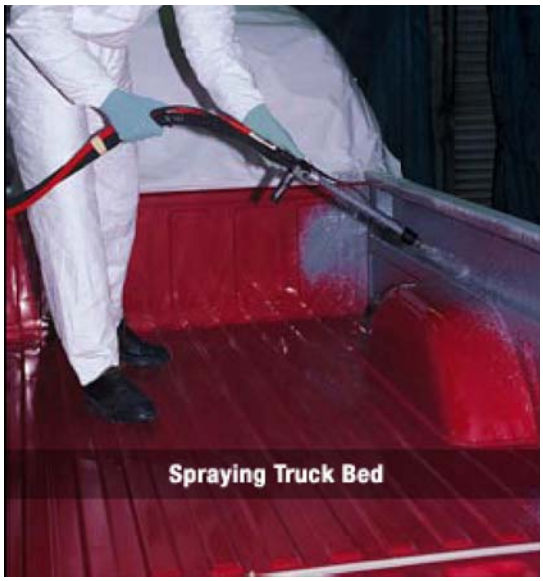
SPRAY-ON TRUCK BED LINERS:

Exposure to Methylene Diphenyl Isocyanate (MDI), a.k.a. Methylene Bisphenyl Isocyanate

The Virginia Occupational Safety and Health (VOSH) Program in conjunction with Region III federal OSHA has established a Local Emphasis Program (LEP) targeting spray-on truck bed liner applicators. VOSH will be conducting inspections of workplaces that have been identified as applicators of spray-on truck bed liners. This emphasis program will focus on the hazards of overexposure and involve compliance inspections in shops performing this work. The goal of this LEP is to eliminate MDI overexposures during MDI-based spray-on coating operations.

Protective liners are applied to truck beds and/or other vehicular applications using a spray-application process. All spray-on truck-bed liners involve mixing two-part urethane components and spraying the polymerizing urethane onto a cleaned and scuffed truck bed. This process is coming into greater use for non vehicular applications as well.


Spraying Truck Bed

Why is there a problem?

Spray-on truck-bed liners contain diisocyanates, including methylene diphenyl isocyanate (MDI), a highly reactive, toxic compound that can result in long-term lung impairment, asthma, other serious health problems and even death. These are a group of very reactive compounds used to make urethane, polyurethane and polyurea coatings. Workers applying materials that contains urethane products can be exposed to excessive levels of these hazardous chemicals. Exposure to diisocyanates produces irritation to the skin, mucous membranes, eyes, and respiratory tract. Probably the most debilitating health effects from workplace exposure to diisocyanates are respiratory and formal sensitization.

Exposures can lead to sensitization depending on the type of exposure, the exposure concentration, the route of exposure, and the individual's susceptibility. Dermal sensitization can result in such symptoms as rash, itching, hives, and swelling of the extremities. Respiratory sensitization from exposure to diisocyanates results in the typical symptoms of asthma. According to NIOSH, high concentrations may result in chemical bronchitis, chest tightness, nocturnal wakening, pulmonary edema, and death (HETA 95-0311-2593).

Are you and your employees at risk?

Your current practices may not sufficient to protect you and your employees from diisocyanate overexposure. The greatest risk of overexposure occurs when the mixture is applied in a poorly ventilated area which facilitates the breathing in the fine droplets (aerosols) generated by the spray gun. It is important to realize that the object being sprayed can also create a confined area that greatly increases the airborne concentration of diisocyanate. If the spray operation is not well controlled, especially with properly functioning exhaust ventilation, then nearby individuals such as shop helpers, office workers, sales staff, managers and others may also be exposed to lower but potentially harmful levels of diisocyanates.

What are the health effects from exposure?

"<u>Immediate</u>" - health effects which may occur up to 8 hours after exposure include:

- *Allergic sensitization, which is a permanent condition where breathing or skin problems can return with increasing severity following further exposure to the sensitizing agent, even at very low exposure levels.*
- *Wheezing, shortness of breath or coughing.*
- *Irritation of the eyes and lungs.*
- *Stuffiness of the nose.*
- *Sore throat.*
- *Tightness in the chest.*

"<u>Long-term</u>" - health effects which may occur at some time after exposure and can last for months or years:

- *Permanent breathing or chest problems, including asthma, even when no longer exposed.*
- *Increased sensitivity. Severe asthma attacks could result if a person is exposed again – even at concentrations well below the established exposure limits. Once sensitized to diisocyanates, a worker should not be exposed to any concentration and should not be allowed to work where he or she may be exposed further.*
- *Repeated or prolonged exposure of the skin to diisocyanates may cause a skin rash and cause an allergic skin reaction.*

An unusual property of diisocyanates is their ability to sensitize the respiratory system (i.e., lungs) even if the initial exposures are only to the skin (there may be no reaction on the skin). This means that a worker who gets diisocyanates on their skin may later have a very severe allergic reaction (like asthma) when they breathe in these compounds.

What if a worker develops symptoms or breathing problems?

Workers who develop breathing problems or any of the other symptoms listed above should see a doctor immediately and not return to the shop until a physician has cleared them. Continued exposure could lead to permanent lung damage and even death from a severe asthmatic reaction.

How do I protect my workers and myself?

Your sense of smell will not warn you that you are being overexposed to these compounds. There are several steps you must take to ensure that you and your workers do not breathe in or come in direct contact (via the skin or eyes) with diisocyanates. If you use diisocyanates or products containing diisocyanates, you must determine the potential for worker exposure. In most spray-on bed liner operations, diisocyanates will become airborne during the application process.

Depending on the bed liner product and efforts at control, diisocyanates may be present above the permissible exposure limit (PEL). Measuring the amount of diisocyanates in the air is the only reliable way to determine the exposure level. There are three ways to control exposure to diisocyanates: engineering controls, work practices, and personal protective equipment. If you need assistance in taking the measurements or to determine the options for controlling overexposures in your workplace, you can call a VOSH safety and health consultant (see Consultation Services elsewhere on this site).

VOSH offers free Consultation Services designed to help employers recognize and control health and safety hazards, and to achieve compliance with VOSH occupational safety and health regulations. The program, which is separate from VOSH enforcement, also assists employers in developing an effective safety and health program. Companies using Consultation Services will have their inspections deferred until they have had an opportunity to complete any abatement actions called for in the consultation report.

VOSH continues to emphasize compliance assistance and to focus on prevention of occupational injuries and illnesses. As part of that emphasis, the following links provide specific information about the hazards of working with isocyanates:

http://www.osha.gov/SLTC/isocyanates/index.html

http://www.osha.gov/SLTC/autobody/otherresources.html

http://www.cdc.gov/niosh/topics/isocyanates/

http://www.cdc.gov/niosh/asthma.html